**IN THE UNITED STATES DISTRICT COURT**
**FOR THE EASTERN DISTRICT OF TEXAS**
**MARSHALL DIVISION**

| | | |
|---|---|---|
| **TQ DELTA, LLC,**<br>**Plaintiff,**<br><br>v. | §<br>§<br>§<br>§<br>§ | **JURY TRIAL DEMANDED** |
| **COMMSCOPE HOLDING COMPANY, INC., COMMSCOPE INC., ARRIS INTERNATIONAL LIMITED, ARRIS GLOBAL LTD., ARRIS US HOLDINGS, INC., ARRIS SOLUTIONS, INC., ARRIS TECHNOLOGY, INC., and ARRIS ENTERPRISES, LLC,** | §<br>§<br>§<br>§<br>§<br>§<br>§<br>§ | **Civil Action 2:21-cv-310-JRG (Lead Case)** |
| **NOKIA CORP., NOKIA SOLUTIONS AND NETWORKS OY, and NOKIA OF AMERICA CORP.**<br><br>**Defendants.** | §<br>§<br>§<br>§<br>§ | **Civil Action No. 2:21-cv-309-JRG (Member Case)** |

# PLAINTIFF TQ DELTA'S OPENING CLAIM CONSTRUCTION BRIEF

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## TABLE OF AUTHORITIES

**Cases**

## I. INTRODUCTION AND BACKGROUND

This patent case involves seven families of Patents. *See, e.g.*, Dkt. 1 (Complaint), at ¶ 29 (listing Patents in *CommScope* case); Dkt. 1 (*Nokia* Case) (Complaint), at ¶ 24 (listing Patents in *Nokia* Case). The Patents cited in this brief are attached as Exhibits 1 to 10.

This case generally relates to communications technology for DSL-based systems. The Family 1 Patents relate to communicating certain specified test and/or diagnostic information about the communication channel over which the multicarrier transceiver communicates. *See, e.g.*, Madisetti Decl. (Exh. 11) at ¶¶ 37–42. The Family 2 Patents, in general, relate to improvements to a technique known as bonding (which, in the context of DSL, refers to using multiple phone lines to transmit data). *See, e.g.*, Cooklev Decl. (Exh. 12) at ¶¶ 115–38. The Family 3 and 9 Patents generally relate to sharing resources, such as sharing memory between an interleaver and deinterleaver or a transmission function and a retransmission function. *Id.* at ¶¶ 79–95. The Family 4 Patents generally relate to techniques to reduce the peak-to-average-ration ("PAR") of a carrier signal by scrambling the phase characteristics of the carrier signals. *See, e.g.*, Madisetti Decl. at ¶¶ 49–70. The Family 6 Patents generally relate to techniques to adapt noise protection to changing conditions while continuing to communicate data. *See, e.g.*, *id.* at ¶¶ 78–97. Lastly, the Family 10 Patents generally relate to assigning different signal-to-noise ("SNR") margins to different carriers to address the tradeoff between channel robustness and the available data rate. *See, e.g.*, Cooklev Decl. at ¶¶ 96–114.

For the reasons that follow, TQ Delta respectfully requests that the Court enter TQ Delta's proposed constructions and reject Defendants' definiteness challenges.

## II. APPLICABLE LAW

This Court is familiar with claim-construction law and definiteness challenges. *Stingray*

*IP Sols., LLC v. Legrand*, No. 2:21-CV-00201-JRG, 2022 U.S. Dist. LEXIS 70339, at *8 (E.D. Tex. Apr. 14, 2022). Indefiniteness must be proven by clear-and-convincing evidence. *Id.* at *10.

## III. AGREED CONSTRUCTIONS

The parties agree "specifying a maximum number of bytes of memory that are available to be allocated to [a/an interleaver/deinterleaver]" in claims 9 and 13 of the '882 Patent and claims 1 and 5 should be construed as plain-and-ordinary meaning. Dkt. 107-1, at 73 ("Plain and ordinary meaning. No construction necessary."); Dkt. 107-2, at 10 ("Plain and ordinary meaning").[1]

## IV. ARGUMENT

### A. Terms in Multiple Patent Families

#### 1. "Transceiver" (Families 1, 2, 3, 6, and 9)

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning, which is: "communications device capable of transmitting and receiving data wherein the transmitter portion and receiver portion share at least some common circuitry." | Plain and ordinary meaning, which is "communications device capable of transmitting and receiving data" |

Both parties propose a plain-and-ordinary meaning construction for this term[2] but dispute whether the that meaning requires that the device share at least some common circuitry. One of

[1] TQ Delta also proposed "[p]lain and ordinary meaning. No construction necessary" for the term "PTM-TC [(Packet Transfer Mode Transmission Convergence)] codewords" found in claims 17 and 37 of the '577 Patent, claims 1 and 9 of the '348 Patent, and claim 17 of the '055 Patent. Dkt. 107-1, at 96. Defendants did not propose a construction for this term. *See generally* Dkt. 107-2.

[2] This term appears the following patents:'686 Patent: Claims 17, 36, 40 (Family 1); '881 Patent: Claims 17, 18, 21, 23, 25, 26, 29, 31, 33, and 37; '193 Patent: Claims 1, 9, 10, 11, 12, 13 '601 Patent: Claims 8, 9, 13, 14, 15, 16, 17, 18, 21 '014 Patent: Claims 1, 3 (Family 2); '882 Patent: Claims 9, 13; '048 Patent: Claims 1, 5; '5473 Patent: Claims 10, 28; '608 Patent: Claims 1, 2, 3, 4; '510 Patent: Claims 21, 22 (Family 3); '835 Patent: Claims 8, 24; '112 Patent: Claims 8, 10, 11, 12, 14 (Family 6); '411 Patent: Claims 10, 11, 17, 18, 19, 25; '577 Patent: Claims 16, 17, 30, 31, 37, 38, 53, 54; '348 Patent: Claims 1, 3, 9, 11; '055 Patent: Claims 11, 17, 19; '4473 Patent: Claims 1, 3; '809 Patent: Claims 1, 3, 4, 6, 8, 10, 11, 13, 15, 17, 18, 20, 22, 24, 25, 27 (Family 9).

ordinary skill in the art would understand that a transceiver shares at least some common circuitry, as the Delaware Court concluded for this term. *TQ Delta, LLC v. 2Wire, Inc.*, No. 1:13-cv-01835-RGA, 2018 U.S. Dist. LEXIS 14573, at *5-7 (D. Del. 2018) (*Family 1 Op.*) (Exh. 20). This aligns with the extrinsic evidence. *See, e.g.*, 1998 Merriam Webster Dictionary (defining a "transceiver" as "a radio transmitter-receiver that uses many of the same components for both transmission and reception") (Exh. 16);[3] 1988 IEEE Standard Dictionary of Electrical and Electronics Terms ("The combination of radio transmitting and receiving equipment in a common housing . . . and employing common circuit components for both transmitting and receiving.") (Exh. 17).

**2. "Operable To" / "Configurable To" (Families 2, 3, 6, 9, and 10)**

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning, which is: "able to be configured" / "capable" / "capable to" | Plain and ordinary meaning, not mere capability |

The terms "operable to" and "configurable to" should be given their plain-and-ordinary meaning.[4] This is "able to be configured" / "capable" / "capable to." The terms at issue occur in multiple patent families to describe various dynamic functionality or configurations, some depending on changing transmission conditions. For example, in Family 2, the claims recite transceivers "configurable to simultaneously operate with a combination of bonded and unbonded transceiver" and "operable at" a first and second data rate ('193 Patent, Family 2):

1. A device comprising:

[3] All emphases are supplied unless otherwise noted.

[4] These terms appear the following patents: '193 Patent: Claim 1, 9, 13; '601 Patent: Claims 8, 14, 21; '014 Patent: Claim 1 (Family 2); '608 Patent: Claims 1, 4; '510 Patent: Claim 21, 22 (Family 3); '112 Patent: Claim 8 (Family 6); '577 Patent: Claims 16, 17, 30, 31, 37, 38, 53, 54; '348 Patent: Claims 1, 3, 9, 11; '055 Patent: Claim 11; '4473 Patent: Claims 1, 3 (Family 9); '354 Patent: Claim 10; '988 Patent: Claim 16 (Family 10).

> a plurality of transceivers **configurable to** simultaneously operate with a combination of bonded and unbonded transceivers, wherein a first transceiver of the plurality of transceivers is **operable at a first data rate**, and a second transceiver of the plurality of transceivers is simultaneously **operable at a second data rate** that is different than the first data rate, wherein the first and second transceivers are **operable as bonded** transceivers and wherein a third transceiver, of the plurality of transceivers, is simultaneously **operable at a third data rate** and the third transceiver is not bonded with any other transceiver.

In Family 3, for example, the claims recite a transceiver "operable to transmit a message indicating a maximum number of bites associated with an interleaver function of a transmit latency path…" ('608 Patent, claim 1):

> 1. A transceiver comprising:
>
> a transmitter portion **operable to** transmit a first message over a channel, wherein the first message indicates a first maximum number of bytes associated with an inter leaver function of a transmit latency path and a first maximum number of bytes associated with a deinterleaver function of a receive latency path; and a receiver portion **operable to** determine a change in a channel condition for the channel; the transmitter portion further **operable to** transmit a second message over the channel after determining the change in the channel condition, . . . .

A plain reading of the claims indicates that the "operable to" / "configurable to" terms mean that the claimed transceivers must be capable of performing the recited claim elements. Defendants, through their negative limitation "not mere capability," attempt to read out functionality present in an accused transceiver but that may require operation or configuration of the transceiver. For example, in Family 2, bonded transceivers must be connected through wires. A transceiver that contains the capability to be bonded with another transceiver could satisfy the bonding elements although the transceivers are sold individually and are not bonded out of the box. *See Radware, Ltd. v. F5 Networks, Inc.*, 147 F. Supp. 3d 974, 1004 (N.D. Cal. 2015) ("If the infringer, on the other hand, sells a computer preloaded with infringing software code, the computer is 'configured,' or 'operable,' to perform the claims, and may be infringing under *Finjan*

and *Fantasy Sports*."); *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1203-05 (Fed. Cir. 2010) (upholding infringement verdict where "it is undisputed that software for performing the claimed functions existed in the products when sold—in the same way that an automobile engine for propulsion exists in a car even when the car is turned off"); *Fantasy Sports Props. v. Sportsline.com, Inc.*, 287 F.3d 1108, 1118 (Fed. Cir. 2002) ("[A]lthough a user must activate the functions programmed into a piece of software by selecting those options, the user is only activating means that are *already present in the underlying software*.") (emphasis in original).

### B. Family 1 Terms

#### 1. "Each Bit In The Diagnostic Message Is Mapped To At Least One DMT Symbol"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "each bit in the diagnostic message is communicated using a modulation scheme where a DMT symbol (or two or more DMT symbols) represents only a single bit of the diagnostic message" | Indefinite. |

This term[5] is not indefinite. TQ Delta proposes the construction adopted by the Delaware Court (which also rejected a definiteness challenge). *Family 1 Op.*, 2018 U.S. Dist. LEXIS 14573, at *20–25. Those in the art understand that "each bit in the diagnostic message is mapped to at least one DMT symbol" refers to a more robust form of communication utilized in the presence of "noise" to ensure more reliable communication of the diagnostic message.

The specification provides examples of the one bit per DMT symbol modulation message

[5] These terms include the following: "each bit in the diagnostic message is mapped to at least one DMT symbol" ('686 Patent: Claim 17); "DMT symbols that are mapped to one bit of the diagnostic message" ('686 Patent: Claim 36); and "at least one bit in the diagnostic message is mapped to at least one DMT symbol" ('686 Patent: Claim 40).

encoding scheme. '686 Patent, at 3:54–67 (disclosing that "[i]n the one bit per DMT symbol modulation message encoding scheme, a bit with value 0 is mapped to the REVERB1 signal and a bit with a value of 1 mapped to a SEGUE1 signal.").

Defendants contend that a person of ordinary skill in the art has no conception of what it means to "map" a bit to a DMT symbol. Defendants take issue with the REVERB1 and SEGUE1 signal example on the basis that it refers to "signals," not "symbols." McNair Decl. (Exh. 13) at ¶ 46. This is a distinction without a difference; a DMT symbol is a time domain, a signal period, for a signal. *See* Madisetti Decl. at ¶¶ 26. 27, 29, 31, 41, 45–48. Defendants also state that "the term 'mapped' could mean that the same bit value is represented by one symbol, two symbols, or every symbol that results from a given DMT signal." McNair Decl. at ¶ 46. The fact that the claims cover various scenarios or that a mapping function would need to be defined (*Id.*) does not render them indefinite. Finally, Defendants claim, without support, that the REVERB1 and SEQUE1 signals are not part of the diagnostic message. *Id.* at ¶ 48. Even if true, that argument misses the point—it is undisputed that the Patents teach a bit-to-signal mapping. That the signals may also be used in other contexts does not render the claim indefinite.

Next, Defendants contend, that because the claims encompass mapping one bit to at least one DMT symbol (*e.g.*, more than one symbol), they are indefinite. McNair Decl. at ¶ 49. There is no support for this assertion. There is also nothing inconsistent with mapping the same bit to more than more DMT symbol. In fact, given the goal of more robust transmission of the diagnostic message, that would make sense (and Dr. McNair's declaration indicates that he understands how one bit could be transmitted by more than one DMT symbol). *Id.* at ¶ 51; *see also id.* at ¶¶ 50–54. The fact that the G.992.1 specification states that the REVERB1 and SEQUE1 signals span multiple periods is consistent with the language that the bit is mapped to "at least one" DMT

symbol. TQ Delta thus respectfully requests that the Court adopt its proposed construction and rejects Defendants' indefiniteness challenge.

**2. "Array Representing Frequency Domain Received Idle Channel Noise Information"**

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "ordered set of values representative of noise in the frequency domain that was received by a transceiver on respective subchannels in the absence of a transmission signal on the received channel" | "array of values representative of noise in the frequency domain that was received by a transceiver on respective subchannels in the absence of a transmission signal" |

The parties present similar constructions for this term[6] except in two respects: 1) TQ Delta proposes that "array" means an "ordered set of values" and Defendants do not propose a construction; and 2) TQ Delta proposes that the absence of a transmission signal need only be on the received channel and Defendants propose, through omission of that language, that there must be a complete absence of a transmission signal. TQ Delta's proposed construction is the same construction adopted by the Delaware Court. *Family 1 Op.*, 2018 U.S. Dist. LEXIS 14573, at *10–13. Regarding "array," TQ Delta does not understand there to be a substantive dispute regarding the meaning of that term, and TQ Delta's plain-meaning construction will help the jury.

Regarding "on the received channel," the specification makes clear that a complete absence of any transmission signal is not required. Indeed, such a notion would be inconsistent with the concept of measuring noise, as one source of noise is transmission of data services on adjacent channels: "DSL systems experience disturbances from other data services on adjacent phone lines, such as, for example, ADSL, HDSL, ISDN, T1, or the like." '686 Patent at 1:44–49. The specification further discloses that "modem[s] transmit[] data over a multiplicity of subchannels

[6] These terms appears in Claims 17, 36, and 40 of the '686 Patent.

of limited bandwidth," that the upstream modem transmits data to the downstream modem over a first set of subchannels and upstream over a second set of subchannels. *Id.* at 2:1–14. Requiring a complete absence of a transmission signal is therefore too narrow and vitiates one of the primary sources of noise common in the field of DSL technology and addressed by the invention.

### C. Family 2 Terms

#### 1. "Plurality of Bonded Transceivers"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "two or more transceivers located on the same side of two or more physical links where each transceiver is configurable to transmit or receive a different portion of the same bit stream via a different one of the physical links" | "two or more transceivers, located on the same side of two or more physical links and each corresponding to one of the physical links, coordinated to transmit or receive a different portion of the same bit stream via a different one of the physical links" |

The parties dispute whether a "bonded transceiver"—a type of device—is "configurable to" perform bonding (TQ Delta's construction) or is actively performing those operations (reflected in Defendants' "coordinated to" construction). TQ Delta's construction is correct.

First, the Patents teach that a "bonded transceiver" is a device that, as a result of hardware and/or software, is configurable to perform bonding (just like a screwdriver is capable of driving a screw). They state that the system can be "implemented by physically incorporating the system and method into a software and/or hardware system, such as the hardware and software systems of a communications transceiver." '881 Patent at 11:31–34; *see also id.* at 4:40–45 ("[I]n general, it should be appreciated that any combination of 'bonded' and unbonded, i.e. traditional, ADSL PHY's, may be configured between the access node 100 and the broadband network determination 200. Furthermore, it should be appreciated that all of the ADSL PHYs can be bonded together.").

Second, TQ Delta's proposed construction is the one that the Delaware Court arrived at. The Court there rejected Defendants' construction and held that "the recited 'plurality of bonded

transceivers' need not be actively bonding." *TQ Delta, LLC v. 2Wire, Inc.*, No. 13-cv-01835-RGA, 2018 U.S. Dist. LEXIS 19913, at *17 (D. Del. Feb. 7, 2018) (*Family 2 Op.*) (Exh. 21); *see also id.* ("The specification's disclosure that system of the invention can be implemented by 'physically incorporating' the elements of the claims 'into a software and/or hardware system' does not suggest that actual operation of the system would be required to practice the system claims of the invention.") (quoting '881 Patent at 11:31–34).

Third, TQ Delta's construction is consistent with Federal Circuit law. An apparatus claim covers "what a device *is*, not what a device *does*." *Hewlett-Packard Co. v. Bausch & Lomb, Inc.*, 909 F.2d 1464, 1468 (Fed. Cir. 1990) (emphases in original). Defendants' construction, rather than follow that law, improperly "injects a use limitation into a claim written in structural terms." *Paragon Sols., LLC v. Timex Corp.*, 566 F.3d 1075, 1090 (Fed. Cir. 2009); *see also Roy-G-Biv Corp. v. ABB, Ltd.*, No. 6:11-CV-622, 2013 U.S. Dist. LEXIS 104104, at *52 (E.D. Tex. July 25, 2013) (rejecting proposed construction "because it would result in incorrectly defining the device in terms of its intended use, instead of in terms of what the device actually *is*") (emphasis in original). For these reasons, TQ Delta respectfully requests entry of its proposed construction.

**2. "Reduce a Difference in Latency Between the Bonded Transceivers"**

| **TQ Delta's Proposed Construction** | **Defendants' Proposed Construction** |
|---|---|
| "reduce a difference in configuration latency" | Indefinite, or, if not indefinite, "minimize the difference in the configuration latencies between the bonded transceivers" |

The Delaware Court adopted the construction that TQ Delta proposes, *Family 2 Op.*, at *25–26, and rejected Defendants' definiteness attack, *TQ Delta, LLC v. 2Wire, Inc.*, 373 F. Supp.

3d 509, 523–24 (D. Del. 2019) ("*Family 2 SJ Op.*") (Exh. 22). That result should apply here.[7]

Those of skill in the art would understand the scope of this term with reasonable certainty. Cooklev Decl. at ¶ 141. "The asserted claims are clear on their face as to what is claimed," as the Delaware Court found. *Family 2 SJ Op.*, 373 F. Supp. 3d at 524. The claims recite "utilizing at least one transmission parameter value . . . to reduce a difference in latency between the bonded transceivers." '881 Patent, claim 1. The specification explains that the transmission parameter values determine the configuration latency. '881 Patent at 6:10–15 ("[C]onfiguration latency . . . is based on the configuration of the DSL transmission parameters. . . ." which include "the data rate, coding parameters, such as the coding method, codeword size, interleaving parameters, framing parameters, or the like"). And the Patents provide examples of how to use transmission parameters to reduce the difference in latency between transceivers. *See, e.g.*, '881 Patent at 6:66–7:34 (describing equations based on codeword size, interleaver depth, and data rate).

Defendants assert indefiniteness on the basis that, until initialization has been substantially completed, there is allegedly "no known configuration latency" because the data rate is unknown. Zimmerman Decl. at ¶ 60.[8] The Delaware Court rightly rejected this argument because "[t]he

[7] These terms include the following terms that appear in claims 17, 25, 33, and 37 of the '881 Patent (depending on the term): "reduce a difference in latency between the bonded transceivers"; "each bonded transceiver utilizing at least one transmission parameter value to reduce a difference in latency between the bonded transceivers; "utilize at least one transmission parameter value, for each transceiver in a plurality of bonded transceivers, to reduce a difference in latency between the bonded transceivers"; and "utilize at least one parameter associated with operation of at least one of the first and second transceivers to reduce a difference in latency between the first and second transceivers."

[8] Defendants also argue that the term is indefinite because reducing configuration latency could hypothetically increase total overall latency due to differences in wire latency. *Id.* at ¶ 61. Lacking, however, is any evidence in real systems that wire latency is a significant enough relative to configuration latency such that reducing configuration latency through transmission parameters would not reduce the overall latency.

asserted claims are clear on their face"—using transmission parameters to reduce latency differences, *Family 2 SJ Op.*, 373 F. Supp. 3d at 524—and the claims do not require comparing actual latency values (or actual data rates). And Defendants' position conflicts with the Patents.

The specification teaches, in the example embodiment, that the data rate is provided to a transceiver when it is configured and before the transceiver begins to transmit data. *See, e.g.*, '881 Patent, at 5:7–9 ("The configuration of the multi-pair multiplexing transmitter 300 can be varied to, for example, provide an equal or unequal data rate on the DSL PHYs."); *id.* at 5:9–11 ("[A]n equal data rate is applied to all of the DSL PHYs."); *id.* at Fig. 15, 10:31–54 (describing that, in the first step at the transmitter, cell distributions "are determined, for example, based on differing data rates between the DLS PHYs, or the like" and compensating for differential latency, in a later step, by buffering). The specification then explains that the receiving transceiver, if necessary, can buffer the received data to account for a difference in latency between transceivers. *Id.* at Fig. 9, Fig. 15, 6:36–55 (detailing use of buffers as a way to deal with "the issue of delay"), 10:40–47 (teaching that buffering may compensate for differential latency).

This disclosure shows that the claimed "reduction" can relate to what the latency difference would have otherwise been in the absence of the transmission parameters—and not a comparison of measured values. Defendants' definiteness challenge fails.

Defendants' alternate construction—"minimize the difference in the configuration latencies between the bonded transceivers"—also conflicts with the evidence. As the Delaware Court found, there is "no reason here to change the claim language the patentee drafted"—and replace "reduce" with "minimize." *Family 2 Op.*, at *25–26. "Reduce" and "minimize" are two different concepts, and Defendants fail to identify any alleged disclaimer. *Id.* To the contrary, as detailed above, the specification contemplates utilizing the transmission parameter values will not

necessarily eliminate (or reduce to its smallest amount) configuration latency, reflected in the disclosures of buffers to account for latency at the receiver.

### D. Family 3 Terms

#### 1. "Shared Memory"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "common memory used by at least two functions, where a portion of the memory can be used by either one of the functions" | Plain and ordinary meaning |

TQ Delta's proposal matches how the Delaware Court construed this term.[9] *TQ Delta, LLC v. 2WIRE, Inc.*, No. 1:13-cv-01835-RGA, 2017 U.S. Dist. LEXIS 206989, at *7 (D. Del. Dec. 18, 2017) ("*Family 3 Op.*") (Exh. 23); *TQ Delta, LLC v. Zyxel Communs., Inc.*, No. 1:13-cv-02013-RGA, 2018 U.S. Dist. LEXIS 77271, at *19–24 (D. Del. May 8, 2018) ("*Family 9 Op.*") (Exh. 24). That construction aligns with the record. A Delaware jury rendered a verdict under that construction, and this construction will help the jury here understand this term.

The ordinary meaning of a "shared" resource (like "shared memory"), as the Patents detail, is a common resource used by at least two functions. *See, e.g.*, '882 Patent, at (57) ("A transceiver is designed to share memory and processing power amongst a plurality of transmitter and/or receiver latency paths . . . ."); *id.* at 4:59–62 ("The shared memory 120 is shared amongst the two transmitter portion interleavers 216 and 226 and two receiver portion deinterleavers 316 and 326. . . ."); *see id.* at Fig. 1 (depicting shared memory between transmitter and receiver portions). Indeed, both sides appear to agree on that point; the Delaware Court adopted the "used by at least

[9] These terms appear in the following Family 3 Patents: '882 Patent: Claims 9 and 13 ("shared memory"); '048 Patent: Claims 1 and 5 ("shared memory"); '5,473 Patent: Claim 10 ("sharing the memory"); '608 Patent: Claim 2 ("operable to be shared / sharing"); '510 Patent: Claim 21 ("shared memory").

two functions" language from defendants. *Family 3 Op.*, 2017 U.S. Dist. LEXIS 206989, at *7; *see also* Dkt. 353, *TQ Delta, LLC v. 2Wire, Inc.*, No. 1:13-CV-1835-RGA (D. Del. Sept. 6, 2017), at 49 (2Wire arguing that "'Shared Memory' Is Used By At Least Two Functions").

Defendants now appear to dispute the language "where a portion of the memory can be used by either one of the functions," even though they (through 2Wire) "d[id] not contest" in Delaware "that for these patents, at any one time, a certain part of the memory can be used by one function or the other, but not both." *Family 3 Op.*, 2017 U.S. Dist. LEXIS 206989, at *10; Wesel Decl. (Exh. 15) at ¶¶ 42–45. This new position is incorrect, as the intrinsic record shows.

The claims recite "allocating" (or a related word) the shared memory between an interleaver and deinterleaver, which reflects that each allocated portion can be used by either the interleaver or deinterleaver—but not both. They similarly explain that "the shared memory allocated to the interleaver is used at the same time as the shared memory allocated to the deinterleaver," *see, e.g.*, '882 Patent, claim 5, which further underscores that the interleaver and deinterleaver do not utilize the same portion of memory at the same time. This teaching is consistent with the specification, which describes allocating shared memory for an interleaver (as part of the transmitter portion) and a deinterleaver (as part of the receiver portion) that operate in a transceiver at the same time. *See, e.g.*, *id.* at 5:40–46 (describing that shared memory can "be designed to allocate a first portion of shared memory 120 to a first interleaver, e.g., 216, in the transmitter portion of the transceiver and allocate a second portion of the shared memory to a second interleaver, e.g., 226, in the transmitter portion of the transceiver.").

Defendants' plain-and-ordinary meaning construction ignores the context of the intrinsic record—and asserts that any type of memory that could be used by more than one function at any time, *i.e.*, essentially all memory, is shared memory. But that is not how the Patents use the term,

which refers to a common memory allocated between two functions. And, contrary to Defendants' construction, the Federal Circuit has explained that the "ordinary meaning of a claim term is not 'the meaning of the term in the abstract'" but instead is the "meaning to the ordinary artisan after reading the entire patent." *AstraZeneca AB v. Mylan Pharm. Inc.*, No. 2021-1729, --- F.4th ---, 2021 U.S. App. LEXIS 36127, at *8–9 (Fed. Cir. 2021); *see also Eon Corp. IP Holdings LLC v. Silver Spring Networks, Inc.*, 815 F.3d 1314, 1321 (Fed. Cir. 2016) ("[T]he question is not whether there is a settled ordinary meaning of the terms in some abstract sense of the words. Rather, as we recently explained, 'The only meaning that matters in claim construction is the meaning in the context of the patent.'") (quoting *Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1363 (Fed. Cir. 2016)). TQ Delta thus respectfully requests adoption the Delaware Court's construction.

**2. "Wherein The Generated Message Indicates How the Memory Has Been Allocated Between The [First Deinterleaving / Interleaving] Function And The [Second] Deinterleaving Function" / "A Message Indicating How The Shared Memory Is To Be Used By the Interleaver Or Deinterleaver"**

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | Plain and ordinary meaning, i.e., "the message indicates the amount of memory [that has been allocated to / is to be used by] the [first deinterleaving / interleaving] function and the amount of memory [that has been allocated to / is to be used by] the [second] deinterleaving function" |

Defendants' construction for these terms[10] replaces the words "how the memory has been allocated" (or "how the shared memory is to be used") with "the amount of memory" to be allocated or used. There is no need to rewrite the language, and the construction does not define

[10] These terms appears in claims 10 and 28 of the '5473 Patent.

any technical terms to assist the jury. And it is unclear what claim-scope dispute Defendants are seeking to resolve with this construction. There is no need to construe this term.

It is true that the Delaware Court, adopting TQ Delta's proposal, construed one of these terms in the manner Defendants propose here. *Family 3 Op.*, 2017 U.S. Dist. LEXIS 206989, at *12–24. But the parties in Delaware were addressing a different dispute. In Delaware, defendants claimed that this term required indicating "a number of bytes of memory." *Id.* at *24. In response, TQ Delta asserted that an "amount of memory" was not limited to being measured in bytes (versus codewords or bits or another unit). *Id.* at *12–13. TQ Delta then carried that "amount of memory" language through all of the terms in which defendants claimed a "number of bytes of memory" was required, including "how the memory has been allocated" (even though that term does not recite an "amount of memory"). *See id.* at *12–24.

The Delaware Court rejected defendants' construction. The Court afforded the "amount of memory" term its plain meaning: the term is "broader than 'bytes,' and the jury will not have trouble deciding what is or is not an 'amount of memory.'" *Family 3 Op.*, 2017 U.S. Dist. LEXIS 206989, at *13. Because the Court resolved the parties' dispute on the "amount of memory" term, it adopted TQ Delta's proposal for "how the memory has been allocated" term without further reasoning. *Id.* at *24. There was no discussion of the difference, if any, between TQ Delta's proposed construction and the plain meaning of this term. TQ Delta does not believe there is any.

Defendants, however, were unwilling to agree to a plain-meaning construction of this term. TQ Delta's concern is that Defendants, through the "amount of memory" language, may resurrect the rejected "number of bytes" argument before the jury. TQ Delta thus respectfully requests that the Court reject that argument and afford this term is plain meaning.

### E. Family 4 Terms

#### 1. "Phase Characteristic(s)"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "one or more values that represent the angular aspect of a carrier signal" | plain and ordinary meaning |

A "phase characteristic" is "one or more values that represent the angular aspect of a carrier signal."[11] TQ Delta's proposed construction is the construction adopted by the Delaware Court. Defendants have not articulated a substantive claim scope dispute with respect to TQ Delta's proposed construction. The specification teaches that the phase characteristics of a carrier signal are represented by the QAM constellation points generated by the QAM encoder. '008 Patent at Fig. 1 (depicting QAM encoder); *id.* at 4:1–4. ("In particular, the QAM encoder 42 maps the input serial data bit stream 54 into N parallel quadrature amplitude modulation (QAM) constellation points 58, or QAM symbols 58…."); *id.* at 4:7–9 ("The QAM symbols represent the amplitude and phase characteristics of each carrier signal."); *id.* at 4:14–17 ("As a result, carrier signals have phase and amplitude characteristics based on the QAM symbol 58 and therefore based on the input-bit stream 54."); *see also* Madisetti Decl. at ¶¶ 23–36, 49–70. TQ Delta's proposed construction tracks the clear teaching of the specification that a phase characteristic of a carrier signal is a value (e.g., the QAM symbol constellation points) that represents the angular aspect of the carrier signal.

#### 2. "Substantially Scramble The Phase Characteristics Of The Plurality of Carrier Signal"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "adjust the phase characteristics of the carrier signals by varying amounts to produce a transmission signal with a reduced peak to- | Plain and ordinary meaning |

[11] This term appears in claim 14 of the '008 Patent.

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| average power ratio (PAR)" | |

TQ Delts proposes the construction of this term[12] adopted by the Delaware Court. Defendants have not raised a substantive dispute with that construction. The Patent repeatedly explains substantially scrambling the phase characteristics of the carrier signals is "produce[s] a transmission signal with a reduced PAR." '008 Patent at (57); *id.* at 1:26–29 ("[T]he invention relates to multicarrier communications systems that lower the peak-to-average power ratio (PAR) of transmitted signals."); *id.* at 2:44–47 ("[T]he input bit stream is modulated onto the carrier signals having the substantially scrambled phase characteristic to produce a transmission signal with a reduced peak-to-average power ratio (PAR)."); *id.* at 6:49–53 ("By scrambling the phase characteristics of the carrier signals, the phase scrambler 66 reduces (with respect to unscrambled phase characteristics) the combined PAR of the plurality of carrier signals and, consequently, the transmission signal 38."). This evidence shows that TQ Delta's construction is correct.

### 3. "Same Bit Value" / "Multiple Carrier Signals Corresponding To The Scrambled Carrier Signals Are Used By The First Multicarrier Transceiver To Modulate The Same Bit Value"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "same bit value": "value of the same bit"<br><br>"multiple carrier signals corresponding to the scrambled carrier signals are used by the first carrier first multicarrier transceiver to modulate the same bit value": "a first carrier signal is used by the first multicarrier transceiver to demodulate the value of a bit of the received bit stream and at least one more carrier signal is used by the first multi carrier transceiver to demodulate the value of the | "same bit value": Indefinite.<br><br>"multiple carrier signals corresponding to the scrambled carrier signals are used by the first carrier first multicarrier transceiver to modulate the same bit value": Indefinite. |

[12] This term appears in claim 14 of the '008 Patent.

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| same bit of the received bit stream, wherein the carrier signals correspond to the plurality of phase-shifted and scrambled carrier signals." | |

The issue with these terms[13] is whether Defendants have shown—by clear-and-convincing evidence—that those of skill in the art would not have understood, with reasonable certainty, what the term "same bit value" means. Defendants have not made that showing.

Those of skill in the art would have understood that the term "same bit value" refers to the "value of the same bit." Madisetti Decl. at ¶¶ 57–77. One problem that the Family 4 Patents addresses is that using the same phase characteristic for the same bit values (*e.g.*, a zero value for a bit corresponds to a 90-degree phase characteristic and a one value for a corresponds to a -90-degree phase shift) can increase the peak of the signal (known as the "peak-to-average-ratio" or PAR), which may result in clipping or excess power consumption. *Id.* at ¶¶ 52–61; '008 Patent at 2:16–27. The Patents solve this problem by utilizing a phase scrambler to shift the phases of the carriers for the same bit values (*e.g.*, the bit values that cause the peak) to reduce the PAR of the signal, which reduces the likelihood of clipping and excess power consumption. Madisetti Decl. at ¶¶ 62–70; '008 Patent, at Fig.1, 3:63–5:14. Those of skill in the art would thus understand that the "same bit value" refers to the value of the same bit.

Defendants argue that the "same bit value" could refer to either the bit position or the value of the bit. Zimmerman Decl. at ¶¶ 75–82. But the specification, as Defendants recognize, explains that the "bit value" refers to the data carried by a carrier signal. *See, e.g.*, '008 Patent, at 2:37–40 ("A phase shift is computed for each carrier signal based on the value associated with that carrier

[13] These terms appear in claim 14 of the '008 Patent.

signal. The value is determined independently of any input bit value carried by that carrier signal."); *id.* at 2:55–26 ("The value is determined independently of any input bit value carried by that carrier signal."); *id.* at 4:48–63 ("The phase scrambler 66 determines each value for a carrier signal independently of the QAM symbols 58, and, therefore, independently of the bit value(s) modulated onto the carrier signal."); *id.* at 5:2–3 ("When the equation is independent of the bit values of the input serial bit stream 54, the computed phase shifts are also independent of such bit values."); Zimmerman Decl. at ¶ 78 ("In these passages, a person of ordinary skill would understand that the specification is referring to the value (0 or 1) of any given bit, rather than the specific position of the bit in the bit stream."). The term is definite, and TQ Delta's construction should be entered.

**4. "Computing A Phase Shift For Each Carrier Signal"**

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | computing the amount by which a phase is adjusted for each carrier signal |

The plain meaning of this term[14] should apply. Defendants' proposal replaces "computing a phase shift" with "computing the amount by which a phase is adjusted." Defining a "shift" as "the amount by which a phase is adjusted" does not help a jury beyond what the claims already recite. And it appears that Defendants' construction calls for computing a specific "amount" by which a phase is adjusted, while the plain language can encompass simply computing the fact that a phase shift exists. And while the Delaware Court arrived at the construction Defendants propose, the Court addressed different issues (whether a phase shift was the "angle by which the phase . . . is rotated" and whether it was necessary to expressly include in the construction retrospective,

[14] These terms appear in claim 14 of the '008 Patent.

contemporaneous, and prospective phase shifts). *TQ Delta, LLC v. 2Wire, Inc.*, No. 1:13-cv-01835-RGA, 2018 U.S. Dist. LEXIS 13737, at *20–23 (D. Del. 2018) (*Family 4 Op.*) (Exh. 25).

#### 5. "Combining The Phase Shift Computed For Each Respective Carrier Signal With The Phase Characteristic Of That Carrier Signal"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | adjusting the phase of each carrier signal by an amount computed for that carrier signal |

For the same reasons as the prior term, the plain meaning of this term[15] should apply. Defendants' proposed construction largely copies over its "phase shift" proposal and may be read to overly limit this term for the same reasons. It is true that the Delaware Court entered the Defendants' proposed construction (which was agreed to). *See* Dkt. 362, *TQ Delta, LLC v. 2Wire, Inc.*, No. 1:13-CV-1835-RGA (D. Del. Sept. 14, 2017), at 30 (reciting agreed-to construction). TQ Delta respectfully submits that this construction does not add to the plain claim language.

### F. Family 6 Terms

#### 1. "Steady-State Communication"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "Showtime" | "the state of the transceiver reached after all initialization and training is completed in which user data is transmitted or received" |

TQ Delta's proposal for this term[16] matches the specification's definition: it describes "steady state data transmission" as "i.e., Showtime." '162 Patent, 2:41–47. "[T]he usage 'i.e.'

[15] This term appears in claim 14 of the '008 Patent.

[16] This term appears in claims 8 and 24 of the '835 Patent and claim 8 of the '112 Patent.

('*id est*' or 'that is'), 'signals an intent to define the word to which it refers.'" *Tf3 Ltd. v. Tre Milano, LLC*, 894 F.3d 1366, 1372 (Fed. Cir. 2018) (collecting authority). That definition should apply. Defendants' proposal is what the parties agreed to in Delaware. Dkt. 183 (Joint Claim Construction Chart), at 6, Case No. 1:14-CV-00954-RGA (D. Del. Aug. 23, 2017). TQ Delta does not understand what, if any, claim-scope dispute there is for this term. Given the specification's definition of this term, however, TQ Delta's proposed construction should be adopted.

**2. "Flag Signal"**

| **TQ Delta's Proposed Construction** | **Defendants' Proposed Construction** |
|---|---|
| "signal used to indicate when an updated FIP setting / interleaver parameter value is to be used (the signal does not contain message data indicating when the updated FIP setting / interleaver parameter value is to be used)" | "signal used to indicate when updated FIP settings / interleaver parameter values are to be used" |

TQ Delta does not believe there is a claim-scope dispute between the parties on this term.[17] Both parties propose the same affirmative construction. The parenthetical that TQ Delta proposes was agreed-to in the Delaware case. *Family 6 Op.*, 2018 U.S. Dist. LEXIS 110546, at *7-10. This portion of the language clarifies what the affirmative construction already states—that a flag signal is different than message data, a distinction reflected in the intrinsic record. *See, e.g.*, '835 Patent, at Fig. 6, 19:14–30 ("Next, in step S620, a message is exchanged indicating the new FIP settings. Then, in step S630, the transmitter forwards to the receiver a flag signal indicating when the new FIP settings are to be used."); *see also id.* at 11:66–12:24 (describing a flag signal as a sync flag and a separate step of "send[ing] a message to the transmitting modem 300 indicating the new FIP settings to be used for transmission and reception.").

[17] This term appears in claims 8 and 24 of the '835 Patent and claims 8 and 9 of the '112 Patent.

### 3. "Interleaver Parameter Value"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | the numerical value of the interleaver depth in number of codewords |

The plain-and-ordinary meaning of this term[18] references the interleaver depth, which is a value that can be expressed in multiple ways, such as bits, bytes, or codewords (just like distance can be expressed in inches, feet, and yards). Defendants' proposal improperly limits the term to one way to express that depth: "in number of codewords." This improperly limits the claims to one disclosed example. And the Delaware Court rejected the same attempt to improperly limit the claims. *Family 6 Op.*, 2018 U.S. Dist. LEXIS 110546, at *12-13 ("Because 'interleaver depth' can be measured using a unit other than 'number of codewords,' the specification's reference to measuring 'interleaver depth' 'in number of codewords' must be a mere embodiment. . . . Accordingly, the plain meaning of the claim controls."). That same outcome should apply here.

Interleaver depth may be expressed many ways. One way is in codewords. *See, e.g.*, '162 Patent, at 2:4–13 (expressing depth "in number of codewords"). Another way is in bytes. *Family 6 Op.*, 2018 U.S. Dist. LEXIS 110546, at *13-14 (discussing G.993.1 VDSL standard and incorporation by reference into Family 6 Patents); ITU-T G.993.1, at 15–17 (describing "interleaver depth" as blocks of bytes) (Exh. 18); Provisional Patent App. No. 60/549,804 (Exh. 19) (describing equation for "depth in bytes" in provisional patent application).

Defendants attempt to limit the claims to depth expressed in codewords. But Defendants do not point to any evidence of disavowal or disclaimer required to narrow the claims in this way. *Thomas Swan & Co. v. Finisar Corp.*, No. 2:13-cv-00178-JRG, 2014 U.S. Dist. LEXIS 86209, at

[18] This term appears in claims 10 and 26 of the '835 Patent and claim 8 of the '162 Patent.

*19 (E.D. Tex. June 25, 2014) ("[I]t is well established that in the absence of a clear intention to limit claim scope, the description of a preferred embodiment is an insufficient basis on which to narrow the claims."). The plain meaning of this term should apply.

**4. "FIP Setting" and "FIP Value"**

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | **FIP Setting**: forward error correction and interleaver parameters characterized by the set of parameters for codeword size in bytes, number of information bytes in a codeword, number of parity or redundancy bytes in a codeword, and interleaver depth in number of codewords<br><br>**FIP Value**: numerical value of codeword size in bytes, number of information bytes in a codeword, number of parity or redundancy bytes in a codeword, or interleaver depth in number of codewords |

Defendants propose a construction for these terms[19] that the Delaware Court correctly rejected. *Family 6 Op.*, 2018 U.S. Dist. LEXIS 110546, at *15-18 (rejecting Defendants' construction). "FIP" is an acronym for "Forward Error Correction and Interleaving." A FIP setting (or value) simply refers to forward error correction and interleaver parameters (or values).

Defendants' proposal limits these terms to one (and only one) set of parameters: (1) a value of codeword size in bytes; (2) number of information bytes in a codeword; (3) number of parity or redundancy bytes in a codeword; (4) and interleaver depth in number of codewords. The Delaware Court correctly found that this limitation was improper in view of the intrinsic record:

> Here, Defendants improperly limit "FIP setting" to exactly four parameters, and only those parameters. Although the specification

[19] "FIP setting" appears in claims 8, 10, 24, and 26 of the '835 Patent and claim 8 of the '112 Patent. "FIP value" appears in claims 8 and 24 of the '835 Patent.

> states that "FIP" is "characterized by the set of parameters (N, K. R, D)," the G.993.1 standard, which is part of the intrinsic record, confirms that this statement is a mere embodiment. An "FIP setting" may include other parameters.

*Family 6 Op.*, 2018 U.S. Dist. LEXIS 110546, at *17; *id.* at *18 ("The parties agree that the issues for 'FIP value' are the same as the issues for 'FIP setting.'"); *see also* ITU-T G.993.1, at 15–17 (describing other FEC and interleaving parameters besides N, K, R, and D); Provisional Patent App. No. 60/549,804 (same). Given the broader disclosure in the Family 6 Patents—and the lack of a narrowing statements—Defendants' proposal should be rejected.

### G. Family 9 Terms

#### 1. "Higher Immunity to Noise"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| "higher SNR margin" | plain-and-ordinary meaning. |

The Court should construe this term[20] to help the jury understand the claims. This term relates to characteristics of messages that are tied to a corresponding packet. Specifically at least one message indicates an acknowledgment (known as an "ACK") or a negative acknowledgement (known as a "NACK") of the packet. *See, e.g.*, '348 Patent, claim 1. The ACK and NACK can indicate if the packet was received or not; if the packet was not received, the packet can be retransmitted if necessary.

To ensure that these messages are less likely to be corrupted by noise, dependent claims recite that the messages have a "higher immunity to noise" than the packet. *See, e.g.*, '348 Patent, claim 2 ("the received messages have a higher immunity to noise than the transmitted packet"); *id.*

[20] This term appears in claims 2 and 10 of the '348 Patent and claims 2, 9, 16, and 23 of the '809 Patent.

at claim 10 ("the transmitted messages have a higher immunity to noise than the received packet"). The Patents explain that messages have "higher immunity to noise" than a packet because they have a higher signal-to-noise (known as "SNR") margin (which reflects the margin between the strength of the signal and the noise, typically expressed in decibels (dB)) ('348 Patent, at 16:4–9):

> Alternatively, or in addition, the DMT sub-carriers that modulate these messages could operate with a much higher SNR margin e.g., 15 dB, as compared to the normal 6 dB margin of xDSL systems. This way, the messages would have a higher immunity to channel noise.

The jury should be provided this understanding of what it means for messages to have a higher immunity to noise.

**2. The "Using" Terms**

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | Indefinite |

The dispute for these terms[21] is whether Defendants have shown that transmitting or receiving data (*e.g.*, a packet) "using" various sub-elements of those operations (*e.g.*,

[21] These terms include the following: "receive at least one packet using deinterleaving" ('577 Patent, Claims 16 and 30); "[transmit/retransmit] at least one packet using interleaving" ('577 Patent, Claims 37, 38, 53, and 54); "[transmit/receive] a [packet/plurality of messages] using a forward error correction [encoder/decoder] and [without using] [an/a interleaver/deinterleaver]" ('348 Patent, Claims 1 and 9); "transmitting, by the transceiver, a packet using a forward error correction encoder and an interleaver" ('4473 Patent, Claim 1); "receiving, by the transceiver, at least one message using a forward error correction decoder and without using a deinterleaver" ('4473 Patent, Claim 1); "[transmitting/transmit/receiving/receive] a [packet/message] using forward error correction [encoding/decoding] and [without using] [interleaving/deinterleaving]" ('809 Patent, Claims 1, 8, 15, and 22); "[retransmit/retransmitting] the packet using [the] forward error correction [encoder/encoding] and [the interleaver/interleaving]" ('348 Patent, Claim 3; '4473 Patent, Claim 3; '809 Patent, Claims 3 and 17); "[receive/receiving] a retransmitted packet using [the] forward error correction [decoder/decoding] and [the deinterleaver/deinterleaving]" ('348 Patent, Claim 11; '809 Patent, Claim 10).

interleaving/deinterleaving and encoding/decoding) fail to inform those of skill in the art with reasonable certainty about the scope of the invention. Defendants have not made that showing. Those skilled in the art understand what these terms mean. Cooklev Decl. at ¶¶ 145–46.

The plain language of the claims shows that interleaving and encoding functionality is part of the transmitter portion and that deinterleaving and decoding functionality is part of the receiving portion. Claim 1 of the '348 Patent, for example, recites a transceiver operable to "transmit a packet using a forward error correction encoder and an interleaver" and "receive a plurality of messages using a forward error correction decoder[.]" Claim 9 similarly recites that the transceiver is operable to "receive a packet using a forward error correction decoder and a deinterleaver" and "transmit a plurality of messages using a forward error correction encoder[.]"

The specification matches the claims. On the transmitter side, the specification teaches that the "transmitter portion of a transceiver perform[s] interleaving and/or coding on transmitted information[.]" '348 Patent, at 9:41–49. On the receiver side, the "corresponding deinterleaving and/or decoding is performed by a receiving portion of a transceiver." *Id.* These terms are definite.

### 3. "Receive At Least One Message Without Using Interleaving"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | Indefinite. |

This term[22] is definite for the same reasons as the "using" terms above. Defendants additionally argue indefiniteness because the term states "without using interleaving" (instead of "deinterleaving"). But one of skill in the art would understand that without interleaving refers to the without using interleaving process, which includes deinterleaving at the receiver portion.

[22] This term appears in Claims 37 and 53 of the '577 Patent.

## H. Family 10 Terms

### 1. "A Multicarrier Communications Transceiver Operable To: Receive A Multicarrier Symbol Comprising A First Plurality Of Carriers"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | Indefinite. |

One of ordinary skill in the art would have understood what this term[23] means. Cooklev Decl. at ¶¶ 150–51. The specification teaches how multicarrier modulation is used to transmit bits using multiple carriers:

> Multicarrier modulation, or Discrete Multitone Modulation (DMT), is a transmission method that is widely used for communication over difficult media. Multicarrier modulation divides the transmission frequency band into multiple subchannels, i.e., carriers or bins, with each carrier individually modulating a bit or a collection of bits. A transmitter modulates an input data stream containing information bits with one or more carriers, i.e., bins or subchannels, and transmits the modulated information. A receiver demodulates all the carriers in order to recover the transmitted information bits as an output data stream.

'354 Patent, at 1:32–43; *see also* Cooklev Decl. at ¶ 151. One of ordinary skill would have understood that a multicarrier symbol that comprises a first plurality of carriers to refer to that multicarrier signal, viewed as the collection of bit steams from a digital perspective (e.g., the collection of bits on each carrier). *Id*; *see also* '354 Patent, at [57] ("A multicarrier modem has a plurality of carriers over which data is transmitted."); *id.* at 3:8–13 ("Individually, the carriers form discrete, non-overlapping communication subchannels which are of a limited bandwidth. Collectively, the carriers form what is effectively a broadband communications channel. At the receiver end, the carriers are demodulated and the data recovered.").

[23] This term appears in claim 10 of the '354 Patent.

### 2. "Receive A First Plurality Of Bits On The First Plurality Of Carriers Using A First SNR Margin; Receive A Second Plurality Of Bits On The Second Plurality Of Carriers Using A Second SNR Margin"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | Indefinite. |

One of ordinary skill in the art would have understood what this term[24] means. Cooklev Decl. at ¶¶ 147–49. The Patent explains that the SNR margin is used to determine the number of bits to allocate to each carrier. '354 Patent at 1:57–2:17; *see also* Cooklev Decl. at ¶ 148. The margin is set on each carrier. *See, e.g.*, '354 Patent at 4:14–20 ("In an exemplary embodiment of the invention, the margin is set to be different on at least two subchannels in a discrete multitone modulation system. In this exemplary embodiment, subchannels which are expected to incur greater variations in impairment levels are set to have a higher margin, whereas subchannels which are expected to incur lower variations in impairment levels are set to have lower margins."). Thus, receiving bits on carriers "using a [first/second] SNR margin" is reasonably understood to mean that the claimed multicarrier transceiver is operable to receive bits on a carriers where an SNR margin is used for performing bit loading on the carriers. Cooklev Decl. at ¶ 149.

[24] This term appears in claim 10 of the '354 Patent.

### 3. "Wherein The First SNR Margin Provides More Robust Reception Than The Second SNR Margin"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | Indefinite. |

Those of skill in the art would have understood what it means for one SNR margin to provide "more robust reception" than another SNR margin. Cooklev Decl. at ¶ 152.[25] The Patent describes "robustness" in the context of the SNR margin for a channel as allowing the system to maintain a required bit error rate. *See, e.g.*, '354 Patent, at 2:18–33 (describing an "increase in robustness" as maintaining the required bit-error rate even if noise increases); *id.* 2:34–35 ("[T]here is a tradeoff between the robustness of the channel . . . and the achievable data rate."); *id.* at 3:34–51 (same). Thus, one of ordinary skill would have understood that the first signal-to-noise ("SNR") margin provides more robust reception than the second SNR margin by, for example, reducing the bit error rate (e.g., making it less likely that a transmission would be subject to significant errors, which makes the reception more "robust," e.g., less likely to require error correction or retransmission). Cooklev Decl. at ¶ 152.

[25] This term appears in claim 10 of the '354 Patent.

### 4. "Signal To Noise Ratio (SNR) Margin" / "SNR Margin"

| TQ Delta's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| Plain and ordinary meaning. No construction necessary. | a parameter used in determining the number of bits allocated to each of a plurality of carriers, where the value of the parameter specifies an extra SNR requirement assigned per carrier in addition to the SNR required to maintain a specified bit error rate (BER) for the communication link at a specified bit allocation |

It is unclear if there is a claim-scope dispute between the parties for these terms.[26] SNR margin is an established term to those of skill in the art, referencing "an additional parameter" in multicarrier systems that is "used to determine the number of bits allocated to each subchannel." '354 Patent 2:4–5; *see also* Cooklev Decl. at ¶¶ 108, 148 ("The value of the SNR margin specifies an extra SNR requirement per carrier that is in addition to the minimum SNR required to maintain a specified error rate for the communication link"). While TQ Delta agreed to the same construction proposed by Defendants' here, *TQ Delta, Inc. v. Adtran, Inc.*, No. 14-cv-00954-RGA, 2018 U.S. Dist. LEXIS 71869, at *7-8 (D. Del. Apr. 27, 2018), TQ Delta submits that Defendants' proposed construction is unlikely to assist the jury to resolve any fact issues any more than the simpler term "SNR margin" (which, again, is an established term in the multicarrier communications art).

## V. CONCLUSION

TQ Delta thus respectfully requests that the Court enter TQ Delta's proposed constructions.

[26] These terms appear in claims 10, 11 and 12 of the '354 Patent and claim 16 of the '988 Patent.

Dated: April 26, 2022

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## CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing document is being filed electronically in compliance with Local Rule CV-5(a). As such, this document is being served this April 26, 2022, on all counsel of record, each of whom is deemed to have consented to electronic service. L.R. CV-5(a)(3)(A).

/s/ William E. Davis, III
William E. Davis, III